



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,086	07/07/2003	Robert J. Chiu	H1828	7977
22898	7590	06/01/2005		EXAMINER
				SCHILLINGER, LAURA M
			ART UNIT	PAPER NUMBER
				2813

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EC

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/615,086	CHIU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Laura M. Schillinger	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 14 March 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 7-20 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-6 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/1/05.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 and 5-6 rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's Admitted prior art .

1. A method of forming an integrated circuit comprising:

providing a semiconductor substrate (Admitted prior art Page 2, lines:13-15);

forming a gate dielectric on the semiconductor substrate (Admitted prior art Page 2, lines: 13-15);

forming a gate over the gate dielectric (Admitted prior art Page 2, lines: 13-17);

forming source/drain junctions in the semiconductor substrate(Admitted prior art Page 2, lines:20-28);

forming ultra-uniform silicides on the source/drain junctions (Admitted prior art page 3, lines: 5-11);

depositing a dielectric layer above the semiconductor substrate (Admitted prior art page 2, lines: 28-30); and

forming contacts in the dielectric layer to the ultra-uniform silicides (Admitted prior art page 2, lines: 30-35).

5. The method as claimed in claim 1 wherein depositing the dielectric layer deposits a dielectric material having a dielectric constant selected from a group consisting of medium, low, and ultra-low dielectric constants (Admitted prior art page2, lines:28-30- silicon oxide is considered to have a medium or low dielectric constant).

6. The method as claimed in claim 1 wherein forming the contacts to the ultra-uniform silicides uses materials selected from a group consisting of Ti (Admitted prior art page3, line: 4).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in further view of Saigal et al ('783).

In reference to claims 2-4, Admitted prior art fails to teach the power level , rate of deposition for the silicide layers. Moreover, Admitted prior art teaches that the silicide film is thin, however fails to explicitly teach where the silicide layer is no more than 50A thick.

However Saigal et al teaches the limitations of claims 2-4 as follows:

2. The method as claimed in claim 1 wherein forming the ultra-uniform silicides uses a very low power deposition technique using a power level below 500 watts direct current (Col.6, lines: 65-68).

3. The method as claimed in claim 1 wherein forming the ultra-uniform silicides uses an extra slow rate of deposition of a silicide metal below 7.0 A per second (Col.7, lines: 1-5).

4. The method as claimed in claim 1 wherein forming the ultra-uniform silicides forms an ultra-thin thickness of a silicide metal of not more than 50 A thick (Col.3, lines: 55).

These claims are *prima facie* obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and

In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

***Response to Arguments***

Applicant's arguments filed 3/14/05 have been fully considered but they are not persuasive. Applicant argues that the Admitted Prior Art (AAPA) fails to teach an ultra uniform silicide, however this is not persuasive since the admitted prior art teaches to form a silicide layer which is self-aligned to the source and drain regions. This self-alignment implies that the silicide layer does not have varying thickness extending the silicide beyond the underlying source/drain regions and is therefore ultra uniform. Moreover, Applicant argues that the metal contacts are not taught by prior art, this is also not persuasive given the teaching of contact openings extending to the source/drain regions after completion of the transistor. Lastly, Applicant argues that Saigal fails to teach an ultra uniform silicide as claimed by the Applicant. However, it is important to note that Saigal was not relied upon to teach an ultra uniform silicide, rather Saigal was used to teach that it is known to form silicide layers of 50A and other parameters claimed by the Applicant and not specifically disclosed by the prior art. Therefore, such an argument is also deemed unpersuasive. Applicant is requested by the Examiner to identify what reference Applicant is referring to in the admitted prior art for future prosecution.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2813

Laura M Schillinger  
Primary Examiner  
Art Unit 2813

5/25/05